Geophysical Research Abstracts
Vol. 15, EGU2013-4219, 2013
EGU General Assembly 2013

Peat hydraulic conductivity in different landuses

Pirkko Mustamo, Maarit Hyvärinen, Anna-Kaisa Ronkanen, and Bjørn Kløve
Water Resources and Environmental Engineering Laboratory, University of Oulu, Oulu, Finland (pirkko.mustamo@oulu.fi)

Information on hydraulic conductivity and water retention properties of peatlands is needed, e.g., for modelling hydrology and soil carbon balance of peat soils. Ability to model the behaviour of peat soils, especially those drained for agricultural use, is important as cultivated peatlands act as a major source of CO_2 and N2O emissions in Nordic countries.
Peat soil hydraulic conductivity and water retention properties vary greatly, and their relationship to soil depth and degree of decomposition is not straightforward. The aim of this study was to produce new information about peat physical properties in different land uses and the relationship between peat soil hydraulic conductivity and variables such as soil porosity and degree of humification.
Peat hydraulic conductivity was measured in situ with infiltrometer (direct push piezometer) in six study sites (two pristine bogs, two sites drained for forestry, a cultivated peat land site and a peat extraction site). Measurements were made in several depths according to soil profile. To examine relationship of soil properties and the hydraulic conductivity, undisturbed peat cores of known volume and also disturbed peat samples were collected from the study sites for determination of von Post humification factor, ash content, porosity and bulk density.
Surface layer of the agricultural site had high ash content and bulk density and low porosity compared to the soil beneath it and the soil in other study sites. This was due to added sand and compaction by agricultural practice. Bog, in contrast, had very low bulk density and high porosity. Results show a great variation in hydraulic conductivity within the study sites even when the observations were in the same soil layer. Hydraulic conductivity was lowest in the peat extraction site and the agricultural site, and had higher correlation with study site (= landuse) and the measured layer than with soil porosity.